

Work Order ID 71570

Wednesday, July 06, 2011 1:19:56 PM



Page 1

Item ID: D2804-1

Accept



Setup Start



Revision ID:

Stop



Item Name: Bracket

Start Date: 7/6/2011 Start Qty: 6.00



Cust Item ID:

Required Date: 7/20/2011 Req'd Qty: 6.00



Customer:

Reference:

Run Start



Approvals: Process Plan: CL Date: 11/07/06 Tooling: _____ Date: _____

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr

Revision Nbr

D2804

Rev C

100

0.00



FLOW WATER JET

Waterjet

Memo

0.00

FLOW CNC Waterjet

1-Cut as per File D2804-1-2_Blank

Dwg Rev: C

Prog Rev: C

2-Deburr if necessary

110

0.00



HAAS CNC VERTICAL MACHINING #1

HAAS 1

Memo

0.00

HAAS CNC vertical machine #1

Machine as per folio FA103

120

0.00



QC2- Inspect parts off machine FAI/FAIB

QC

Memo

0.00

Quality Control

ml 11 07 1A (4)

0.00 F.R. 11/08/03

4 0

0.00 F.R. 11/08/03 - 4 0

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D2804-1 PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR: 71576		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
11/08/03	110	1 part, the .757 hole are too big of .002" over tol. R.C. operator error	11/08/05 GSIC12	PER ATTACHED ANALYSIS, THE DEVIATION IS ACCEPTABLE: THE (MARGINS) ARE STILL POSITIVE AND SAFE. THIS W/OUT!	11/08/05	D.A. 11/08/05	11/08/05	11/08/05

NOTE: Date & initial all entries

Work Order ID 71570

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Item ID: D2804-1	Accept		Setup Start	
Revision ID:			Stop	
Item Name: Bracket				
Start Date: 7/6/2011	Start Qty: 6.00		Cust Item ID:	
Required Date: 7/20/2011	Req'd Qty: 6.00		Customer:	
Reference:				

Approvals:	Process Plan:	Date:	Tooling:	Date:	Run Start	
	QC:	Date:	SPC (Y/N):	Date:	Stop	

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130 QC Quality Control	QC8- Inspect parts - second check Memo	0.00 0.00		B.A 11/08/05		4	0		
140 HandFinish Hand Finishing	Chemical Conversion Coat per QSI005 4.1 Memo	0.00 0.00							4X 0 M-11/08/08
150 Packaging Packaging	Identify as per dwg & Stock Location: <u>NO</u> Memo	0.00 0.00							16/8 SP(4)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Work Order ID 71570

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Wednesday, July 06, 2011 1:19:56 PM

Item ID: D2804-1

Accept



Setup Start



Revision ID:

Stop



Item Name: Bracket

Start Date: 7/6/2011 Start Qty: 6.00



Cust Item ID:

Required Date: 7/20/2011 Req'd Qty: 6.00



Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

160

QC21 - Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

11/8/16

ME
11-08-08

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Wednesday, July 06, 2011 1:19:53 PM

Page 1

Work Order ID: 71570

Parent Item: D2804-1

Parent Item Name: Bracket



Start Date: 7/6/2011

Required Date: 7/20/2011

Start Qty: 6.00

Required Qty: 6.00

Comments:

IPP A 00.11.06 New Issue EC

IPP B 06.05.30 Blanks on wtjet EC

IPP Rev:C As per Rev C 06-11-09 JLM

IPP Rev:D Removed Tumbling 08-09-09 JLM Verified By:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
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M6061T6B0.500X10.00

Purchased

No

f

3.0000

4.5

0



6061-T6 Bar .500 x 10.00

11.07.19

Location

Loc Qty

Loc Code

MAT004

3

✓ 111382

3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	71570
Description: Bracket		Part Number:	D2804-1
Inspection Dwg: D2804	Rev: C	Page 1 of 1	

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article
 ☐ Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
Ø0.757	+0.005/-0.000	.7615	✓		Mic ML8	
Ø0.191	+0.005/-0.001	.193	✓		Vern ML7	
1.420	+/-0.001	1.419	✓		"	
Ø0.507	+0.000/-0.001	.5063	✓		Mic ML8	
0.250 deep	+/-0.010	.249	✓		DG ML5	
Ø0.507	+0.000/-0.001	.5063	✓		Mic ML8	
Ø0.191	+0.005/-0.000	.191	✓		Vern ML7	
6.933	+/-0.010	6.933	✓		Vern CM2	
7.578	+/-0.010	7.573	✓		"	
12.304	+/-0.010	12.304	✓		"	
0.125	+/-0.010	.118	✓		Vern ML7	
0.500	+/-0.010	.496	✓		"	
0.125	+/-0.010	.125	✓		"	
0.250	+/-0.010	.250	✓		"	
0.875	+0.000/-0.001	.8747	✓		"	
0.250	+0.000/-0.005	.250	✓		DG ML5	

Measured by: F.K. / omf
Date: 11/08/03

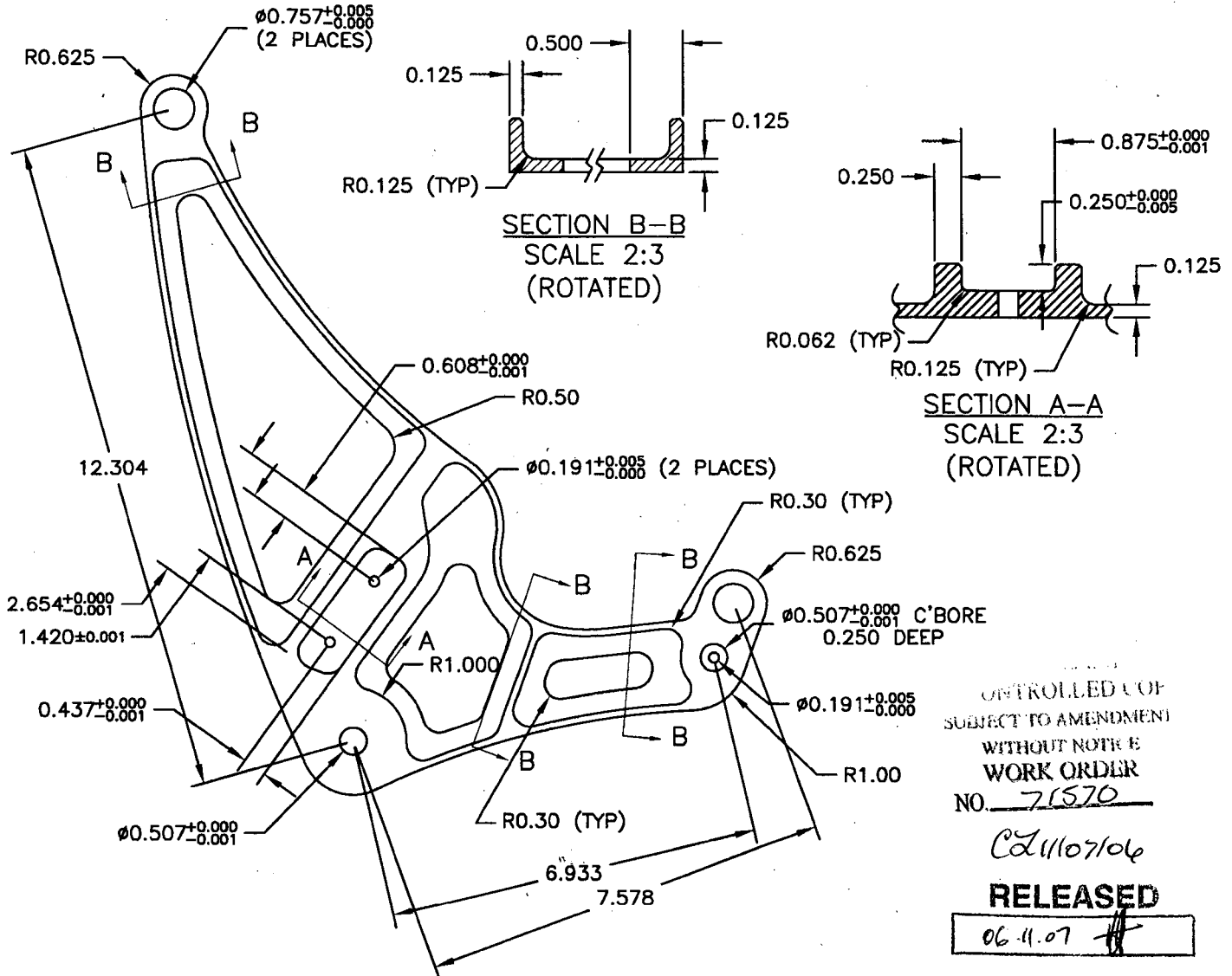
Audited by: G.A.
Date: 11/08/05

Prototype Approval: N/A
Date: N/A

Rev	Date	Change	Revised by	Approved
A	05.04.25	New Issue	KJ/JLM	
B	06.06.05	Removed dimensions 12.625, 0.608, 0.437, 2.654	KJ/EC	
C	06.11.10	Revised per drawing revision C	KJ/JLM	
D	09.03.10	Tolerance revised for Ø0.757	KJ/DD	

DART

DESIGN	CP	DRAWN BY	CP	DART AEROSPACE LTD	REV. C
				HAWKESBURY, ONTARIO, CANADA	
CHECKED	#	APPROVED	#	DRAWING NO.	SHEET 1 OF 2
				D2804	
DATE	06.10.16			TITLE	SCALE
				STA 155 BRACKET	1:3
A	00.11.07			NEW ISSUE	
B	04.11.22			ADD CUTOUTS & -043/-044	
C	06.10.16			CHANGE GEOM. TO ADD CLEARANCE	



CONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 71570

06/11/07/06

RELEASED

06.11.07

D2804-1 BRACKET (SHOWN). D2804-2 BRACKET (OPPOSITE)

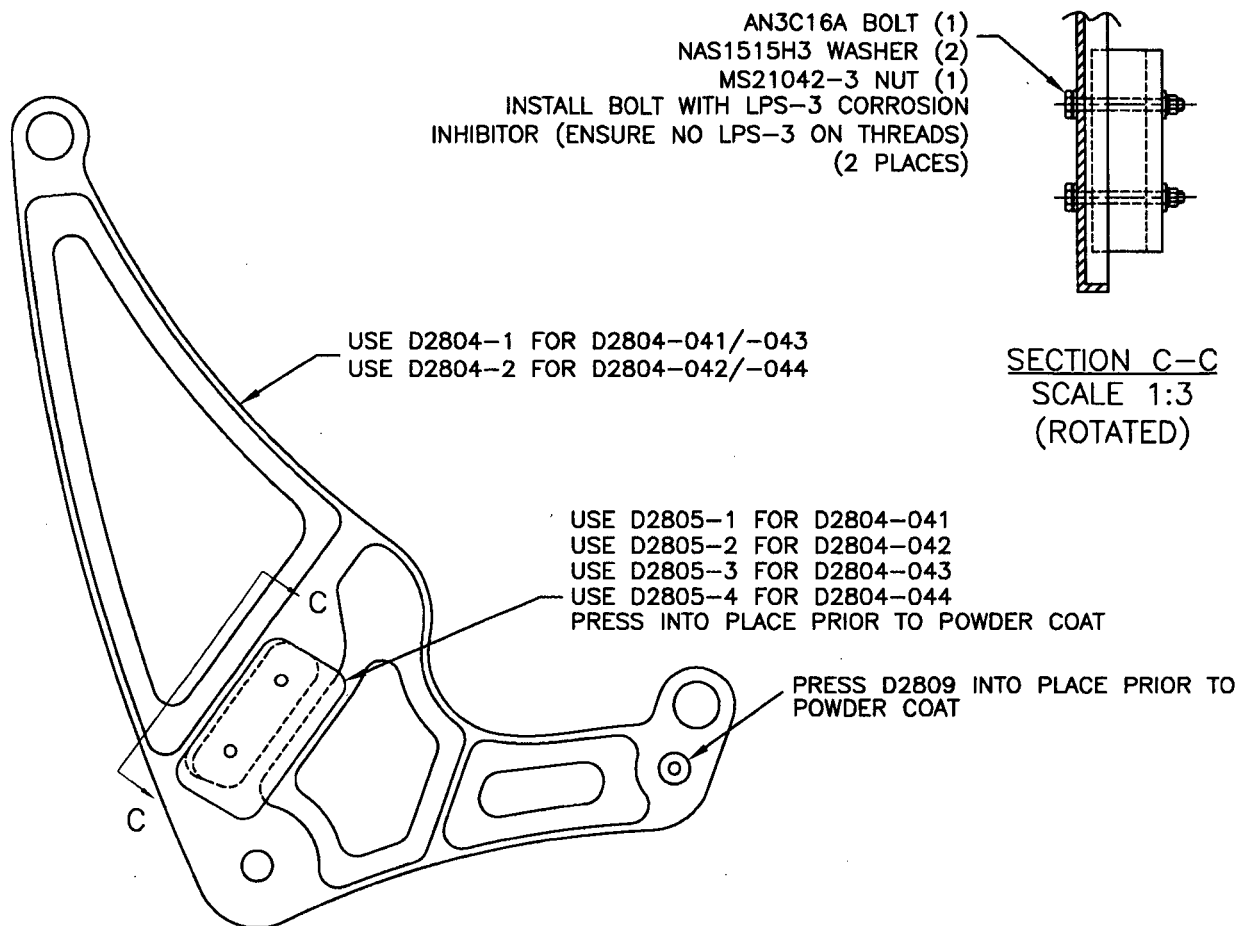
- 1) MACHINE PER DRAWING FILE "D2804-1C.SLDPRF"
- 2) MATERIAL: 6061-T6 (QQ-A-200/8) OR (QQ-A-250/11) 0.500 THICK
- 3) DEBURR TO LEAVE R0.030 - 0.063 ON ALL EDGES
- 4) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
- 5) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED

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DART

DESIGN CP	DRAWN BY CP	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D2804	REV. C SHEET 2 OF 2
DATE 06.10.16		TITLE STA 155 BRACKET	SCALE 1:3



UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 71570

RELEASED06.11.07 *[Signature]*

D2804-041/-043 BRACKET ASS'Y (SHOWN).
D2804-042/-044 BRACKET ASS'Y (OPPOSITE)

6) FINISH: POWDER COAT ASSEMBLY GLOSS WHITE (4.3.5.1) OR GREY SANDTEX (4.3.5.6)
OR BLACK SANDTEX (4.3.5.7) OR GREEN SANDTEX (4.3.5.8) PER DART QSI 005 4.3

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Marc Bellavance

From: David Shepherd <dshepherd@dartaero.com>
Sent: August 4, 2011 9:00 PM
To: 'Marc Bellavance'
Subject: FW: W/O NCR on D2804-1 Bracket
Attachments: image001.png; Oversized Holes on D2804 vs SR-P447-1A.pdf; D2804-RevC.pdf

Importance: High

Marc,

I agree ... Based on your attached analysis, this deviation is acceptable.

David

From: Marc Bellavance [mailto:mbellavance@dartaero.com]
Sent: August-04-11 9:26 AM
To: Shepherd, David
Subject: W/O NCR on D2804-1 Bracket
Importance: High


Hi David,

Qty(1) out of qty(6) D2804-1 Bracket have $\varnothing 0.757 +0.005/-0.000$ holes outside tolerance. Actual measurement is $\varnothing 0.765$, this is true for both holes.

As per attached, I've run the calculations and the deviation seems acceptable but still need to run this by you for approval.

Thanks,



 Please consider your
environmental responsibility
before printing this e-mail

Marc Bellavance
Technical/Shop Support
Tel: 613-632-5200 Ext. 243
Cel: 613-676-0992
Fax: 613-632-9311

Product Documentation: Verify Revision Status/Download [HERE!](#)

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8.5 D2803/D2804/D2990 Bracket Lug Analysis

From section 7.1 of this report, the maximum hardpoint load corresponds to the load at the upper hardpoint at STA 84.29 with the -011/-012 steps installed. If there is a positive margin with the application of Fb84, then the attachment of the D2803/D2804/D2990 brackets to the hardpoints are all acceptable for both the -011/-012 steps and the -013/-014 steps. To be conservative, a fitting factor of 1.15 will be used in this fitting analysis.

$D := 0.757 \cdot \text{in}$	0.705 in	Diameter of hardpoint hole
$R := 0.625 \cdot \text{in}$		Radius of hardpoint lug
$t := 0.5 \cdot \text{in}$		Thickness of bracket at hardpoint
$F_{\text{max}} := F_{\text{b84}}$	$F_{\text{max}} = 1937.5 \cdot \text{lb}$	Maximum hardpoint load (from section 7.1)
$FF = 1.15$		Fitting factor

Tensile Failure Mode

$A_t := (2 \cdot R - D) \cdot t$	$A_t = 0.247 \cdot \text{in}^2$	0.2425 in^2	Tensile area
$P_{\text{ut}} := \frac{F_{\text{max}} \cdot FF}{A_t}$	$P_{\text{ut}} = 9039.047 \cdot \text{psi}$	9188.1433 psi	Ultimate tensile stress
$MS28a := \frac{F_{\text{cy}}}{P_{\text{ut}}} - 1$	$MS28a = 2.761$	2.7004	Margin of Safety

Bearing Failure Mode

$A_b := D \cdot t$	$A_b = 0.379 \cdot \text{in}^2$	0.3825 in^2	Bearing area
$P_{\text{ub}} := \frac{F_{\text{max}} \cdot FF}{A_b}$	$P_{\text{ub}} = 5886.724 \cdot \text{psi}$	5825.1634 psi	Ultimate bearing stress
$f := \frac{R}{D} - 0.5$	$f = 0.326$	0.314	Reduction factor for $e/D < 1.5$
$MS28b := \frac{F_{\text{bry}} \cdot f}{P_{\text{ub}}} - 1$	$MS28b = 1.71$	1.667	Margin of Safety

Shear Failure Mode

$e := R - 0.5 \cdot D$	$e = 0.247 \cdot \text{in}$	0.2425 in	Edge distance
$A_s := 2 \cdot e \cdot t$	$A_s = 0.247 \cdot \text{in}^2$	0.2425 in^2	Shear area
$P_{\text{us}} := \frac{F_{\text{max}} \cdot FF}{A_s}$	$P_{\text{us}} = 9039.047 \cdot \text{psi}$	9188.1433 psi	Ultimate shear stress
$MS28c := \frac{F_{\text{sy}}}{P_{\text{us}}} - 1$	$MS28c = 1.649$	1.6063	Margin of Safety

$$F_{\text{cy}} = 34000 \text{ psi}$$

$$F_{\text{bry}} = 49000 \text{ psi}$$

$$F_{\text{sy}} = 23947.368 \text{ psi}$$